

THURSDAY, FEBRUARY 26, 1880

## THE SECOND YARKAND MISSION

*The Scientific Results of the Second Yarkand Mission, based upon the Collections and Notes of the late Dr. F. Stoliczka.* Published by Order of the Government of India. (Calcutta, 1878-79.)

BY the above publication the India Government and Dr. Stoliczka's scientific friends have raised a most enduring monument to the memory of one whose loss is still felt throughout the world of science. Born in Moravia in 1838, Ferdinand Stoliczka was destined by his father, a colonel in the Austrian army, for the Church; but, as better luck would have it, having taken his degree of Ph.D. in the University of Vienna, he at once obtained a post more in harmony with his tastes in the Vienna Geologische Reichsanstalt, where he laboured until 1862, when he was appointed by the late Prof. Oldham to the responsible position of palæontologist to the Geological Survey of India. His special work in the Survey will be to all time remembered. It forms four of the splendid volumes of the "Palæontologica Indica," all of which, with the exception of one paper by Mr. Blanford, are from the pen of Dr. Stoliczka. Although his chief fame will ever rest on his palæontological work, he was not unknown as a zoologist, and several important papers of his on living forms could be easily called to mind. Considering his age when snatched away from his work and friends, he had accomplished much, and had he lived, would surely have accomplished more. In Mr. V. Ball's recently published "Jungle Life in India" we get a glimpse of Stoliczka as the enthusiastic naturalist visiting the Nicobars. In July, 1873, a mission was sent to the Ameer of Káshghar and Yárkand, under the charge of Sir T. D. Forsyth. Starting from Murree in the Panjáb Hills on July 5, the mission to which Dr. Stoliczka was attached reached Leh, in Ladák, on August 27. After a halt of about a fortnight the journey was continued over the Sakti Pass to Lukong on the Pankong Lake. Yárkand was reached on November 8, and Káshghar on December 4. From Káshghar several excursions were made, Dr. Stoliczka visiting the Chadyr Lake just inside the Russian frontier, and proceeding at another time as far north-east as the Belowti Pass on the road to Ush Turfán.

A treaty was concluded with the Ameer on February 2, 1874, and much valuable information was collected regarding the present condition, resources, history, geography, and trade of the Yárkand and neighbouring countries. On the return Stoliczka was attached to Col. Gordon's party, which left Káshghar on March 17, 1874, reaching Yárkand after a *détour* on May 21, and leaving it on the 28th, when the mission party proceeded to recross the Kuenlun by a more western route than before over the Yangi Diwán, and then took the Kárakoram and Sháyok route to Leh. On June 16 Stoliczka complained of severe headache, with a feeling of oppression on the chest, in spite of which he the same day crossed the Kárakoram, making a collection of, and writing some notes in his diary about the Kárakoram stones. On the 17th he was no better. On the 18th, although suffering much, he climbed a hill to make some scientific exploration,

and the effects of this exertion were at once visible. During the night of that day Col. Gordon ordered a halt for the next day. On the morning of the 19th he fell into a semi-comatose condition, from which he scarcely rallied, and he died a little after one o'clock on that day. Undue physical exertion at an extreme elevation and in a rarified atmosphere was the immediate cause of death. The remains were brought to Leh, where, in a corner of the compound of the British Joint Commissioner's residency they were laid with all honour on June 23, 1874. Over them, at the public expense, a suitable monument has been erected.

The scientific memoirs so far as they have reached this country, are as follows:—The Geology, by W. T. Blanford; the Mammalia, by W. T. Blanford; the Reptilia and Amphibia, by W. T. Blanford; the Pisces, by F. Day; the Hymenoptera, by Fred. Smith; the Neuroptera, by R. McLachlan; the Mollusca, by Geoffrey Nevill; the Syringosphæridæ, by Prof. Martin Duncan. Each of these forms a small folio part, beautifully printed at the Government Press, Calcutta, and excellently illustrated, often with highly-finished coloured drawings. All are based on the material collected during the expedition, and this was chiefly made by or under the direct superintendence of Stoliczka. Mr. Blanford complains that a considerable portion of the collection, including most of the finest specimens, was distributed with the consent of the Government, the greater portion becoming private property, and that the distribution was made with so little care, and with such a disregard of the interests of the Government and Dr. Stoliczka's memory, that even some specially prepared specimens were not to be found when looked for. Still withal the editors have done good and true service to Stoliczka's notes, Mr. Blanford and Mr. Day being helped thereto by their local knowledge.

Of the geological work accomplished Mr. Blanford writes that "very little indeed had been done to elucidate the geological structure of the country." But the results of Stoliczka's explorations during his first journey were very great. In the course of a single season's work in a most difficult country, amongst some of the highest mountains in the world, he clearly established the sequence of the formations, and from his extensive palæontological knowledge was able to do this with an accuracy which has stood the test of subsequent research. He, moreover, added to the list of known formations the representatives of rhætic and cretaceous rocks not previously detected, and showed that some of the other groups might be subdivided. The presence of this remarkable series of marine fossiliferous beds in the North-Western Himalayan region, a series in which all the principal European palæozoic and mesozoic groups, except the Cambrian, Devonian, Permian, and Neocomian are represented, is none the less surprising that scarcely any of the formations, except a few oolitic and cretaceous strata, are found in the peninsula of India beyond the Indus River basin. In the hills of the Panjáb some of the formations have been detected, but they were, until recently, very imperfectly known. In his second and last journey much work was also accomplished, but alas its full details will never be known. From the notes left behind him Mr. Blanford has collated what he could. "It is," he very truly says, "very difficult to do justice to a rough travelling diary such as Dr. Stoliczka

kept. In such a diary first impressions are very often recorded, and subsequent observations do not always show how far the first notes require modification. To the writer this is a simple matter; his notes are memoranda serving to recall details to his mind; but to another who does not possess the clue it is often very difficult to ascertain how far the notes in the diary agree with the final conclusions of the diarist." The sections illustrative of the geology of the country are from Dr. Stoliczka's note-book.

The account of the mammals, also from Mr. Blanford's pen, we are warned must only be considered as a contribution towards the zoology of the countries traversed. It is at present simply impossible to give anything like a complete list of the mammalia inhabiting Eastern Turkestan, the Pámir, and Wakhán. Even of Ladák, which is not only easy of access but is yearly frequented by English travellers and sportsmen, although the larger animals may be known, much more information will be necessary before a complete enumeration can be made. In this valuable contribution towards such a fauna Mr. Blanford describes, among the animals collected at Ladák, a lagomys, a mouse, a vole, and a shrew, which were previously unknown. The districts traversed by the second mission lay, with the exception of Kashmir, where a mixture of Indian (Oriental) forms is found, within the limits of the Palæarctic region; but they belong to different sub-provinces, distinguished chiefly by their physical characters, and especially by their elevation. Western Tibet or Ladák, in which may be included all the area north of Kashmir drained by the Indus and its tributaries, is a part of the high barren Tibetan plateau and the fauna comprises typically Alpine forms such as wild sheep and ibex, marmots and lagomys. The fauna inhabiting the ranges commonly known as the Kuenlun, intervening between the northern water-shed of the Indus and the low plains of Turkestan, is very similar to that of Tibet proper, but several species appear different. The animals of the plains of Eastern Turkestan around Yárkand and Káshghar belong to very distinct types, and appertain to the desert fauna of Central Asia, characterised especially by the abundance of rodents such as *Gerbillus*, *Cricetus* and *Dipus*. The few specimens of the mammals inhabiting the Thian Shan range, Pámir, and Wakhán, contained in Dr. Stoliczka's collection, are insufficient to give much idea of the fauna, as they were collected under great difficulties, during journeys when the ground was for the most part covered with thick snow. In drawing up this account Mr. Blanford has had the assistance of Dr. Dobson for the bats. It is illustrated by fifteen plates, several of which are coloured, in which all the new species are figured, with many osteological details.

The collection of reptiles made was small, partly owing to the country traversed not being rich in such forms of animal life, but still more perhaps because of the unfavourable season at which many of the excursions were made. The Thian Shan was visited in the depth of winter and the Pámir steppes and Wakhán long before the snow had melted, and under these circumstances no snakes, lizards, or other forms of reptilian life could be found. The bulk of the collection consisted of specimens procured on the journey from India to Káshghar in the Panjáb hills beyond Mari, in Kashmir and in Ladák and

those obtained on the return journey between Yárkand and the Kárakoram. Of the lizards several new species are described and figured; of the amphibia only four species in all were collected. This memoir is by Mr. Blanford.

The account of the fishes obtained during the expedition is by Mr. Day. Twenty-five species are enumerated, several of which are described as new. After examining in detail the fishes of Yárkand and those of the adjoining countries, Mr. Day concludes, amongst other things, that there is to be found a peculiar group of carps (*Schizothoracinae*) which has spread almost due east and west from the cold and elevated regions of Eastern Turkestan, but of which the southern progress has been barred by the Himalayas. If we look to the south we see, as it were, that a wave of tropical forms of fishes has at a prehistoric period expanded over that portion of the globe where the Nicobars, Andamans, and the most southern portions of the continent of Asia and the islands of the Malay Archipelago now are, that this fish fauna has its northward progress arrested by some cause at or near where the Himalayas now exist, and mark the division between the fish fauna of India and that of Turkestan.

The collection of Hymenoptera is described by the late Frederick Smith, of the British Museum. It contained sixty-three species, only nine of which appear to have been previously described; five new species are enumerated of that most cosmopolitan genus, *Megachile*; four new species of *Bombus*, and four of *Formica*. *Vespa germanica* was found at Sanju and in its neighbourhood also in Eastern Turkestan; eleven of the new species are beautifully figured from drawings by E. A. Smith.

The Neuroptera described by Mr. McLachlan were only fifteen in number: "four were species of *Odonata* (dragon-flies), one of *Ephemeroidea*, three of *Perlida*, one of *Myrmeleonida*, three of *Chrysopida*, and three of *Trichoptera*. The general aspect is European. All the dragon-flies are European, and two of them occur in Britain. The ant-lion (*Myrmecalurus punctulatus*) is a species of Eastern Europe." The three species of *Trichoptera* were new.

The Mollusca are described by Geoffrey Nevill. As was to be expected, "the fauna of Yárkand proves to be exceedingly poor in mollusca, and these are entirely European in their affinities. The fresh-water shells are indeed either identical with, or most closely allied to, well-known European forms." "The only striking novelty is the new *Succinea martensiana*, its thickness and opaqueness of texture, and its vivid orange-coloured aperture, make it one of the most interesting and peculiar forms of the genus." The characteristic Indo-Malayan genus, *Nanina*, disappears on the confines of Kashmir, but reappears in the Sarafshan Valley. About thirty species, several new, are described from Eastern Turkestan and Ladák, and twenty-five from Kashmir and the neighbourhood of Mari. The new species are all figured.

The last memoir on our list is a very interesting account of the Kárakoram stones by Prof. Martin Duncan; these are described as fossil rhizopods belonging to a new order called *Syringosphærida*, and containing but one family with two genera and six species. The second

genus is called after Stoliczka. This memoir is accompanied by three excellent plates.

Several other memoirs are expected ere this work will be complete. When finished, it will form a worthy monument to the memory of Ferdinand Stoliczka.

### CRYPTOGAMIC FLORA OF SILESIA

*Kryptogamen-Flora von Schlesien.* Herausgegeben von Prof. Dr. Ferdinand Cohn. Zweiter Band, Erste Haelfte: Algen. Bearbeitet von Dr. Oskar Kirchner, und Zweite Haelfte: Flechten. Bearbeitet von Berthold Stein. (Breslau: J. U. Kern, 1878 and 1879.)

THE second volume of the "Cryptogamic Flora of Silesia," edited by Prof. Ferdinand Cohn, has now been completed in two parts. The first is devoted to the algæ, and the second to the lichens, the former having been worked out by Dr. Oskar Kirchner, while the latter part, on the lichens, is from the pen of Berthold Stein. The algæ of Silesia are, of course, fresh-water forms, and include a very fair proportion of all the species recognised as natives of Germany. Thus, reckoning the German algæ-flora at 1,688 species, the Silesian flora contains 794, or 47 per cent. Some of these have not yet been found out of Silesia, Kirchner giving a list of 40 species not yet detected elsewhere, and of these a considerable proportion are new species described for the first time in the present flora. Desmidiæ, Diatomaceæ, and phycchromaceous forms furnish no less than 600 out of the total of 794 species, most of the others being Protococcoideæ and Confervoideæ, these numbering 88 and 86 species respectively, while the remainder is made up by 11 Florideæ, Batrachospermum and allies, and 6 Siphonæ. The work may therefore be said chiefly to describe the Desmidiæ and other Conjugatæ, 225 in number, the Bacillariaceæ (Diatomaceæ), 195, and the 185 Phycchromaceæ. The hypsometrical distribution of the species is carefully given, according to the plan adopted in the first volume, the whole country being divided into four regions. The first includes all land below the elevation of 150 metres, the second all elevations between 150 and 500 metres, the third from 500 to 1,100 metres, and the fourth from 1,100 to 1,500 metres. No less than 63 species, or 8 per cent. of the total number are met with in all the four regions, these species, however, being usually forms widely distributed in Europe. To the fourth or highest region there belong 16 special species out of a total of 104 in the whole region. The third or second highest district includes 131 species, or 16.5 per cent. of the whole, and of these 20 are special. The great majority of the species belong to the first and second regions, a distribution very different, as we shall presently see, from that of the lichens. The first or lowest region contains 472 species, or 59.5 per cent.; the second 612 species, or 77 per cent., while of these, 116 species are only found in the first, and 219 in the second, region. Lastly, it is found that the two regions together contain no fewer than 613 species not found at all in the higher districts.

A considerable part of the introduction is filled with a history of the study of Silesian algæ and of the gradual progress made by different workers in the elucidation of the species and localities. Then follows a long and

excellent account of the anatomy and reproduction of the algæ, which are here defined as chlorophyll-bearing cellular plants not differentiated into stem and leaves. The unicellular and the multicellular thallus is then described, and the various gradations noticed among the unicellular forms, from the spherical Protococcus up to the highly differentiated unicellular Caulerpa, the forms of the multicellular thallus being treated in the same way. Paragraphs are devoted to the cell, cell-wall, cell-contents, and to the different colouring matters contained in the cells of the different groups. The modes of reproduction, non-sexual and sexual, to be observed in the algæ are fully described. As might be expected in a flora, Dr. Kirchner does not employ the subdivisions of the Thallophytes as defined by Sachs, although he fully recognises and points out the affinities exhibited by many chlorophyllaceous and colourless Thallophytes. The algæ, therefore, are considered as a special class, and are subdivided for the purposes of this flora into six orders and into sixteen families. The orders are Florideæ, Confervoideæ, Siphonæ, Protococcoideæ, Zygosporæ, Schizosporæ. The Protococcoideæ are made to include as families the Volvocaceæ, Protococcaceæ, and Palmellaceæ, while the Zygosporæ include the families Conjugatæ and Bacillariaceæ. Lastly the order Schizosporæ includes the Nostocaceæ, with five subdivisions, Rivulariæ, Scytomenæ, &c., and the Chroococcaceæ.

Under the different families the genera and species are fully described, and apparently in a manner well calculated to render the work extremely useful to all botanical students.

The second half of the second volume contains the Lichens, by Berthold Stein. The general treatment of the subject is the same as that already mentioned in the case of the algæ. The introduction, giving an historical account of the progress of Silesian lichenology, the hypsometrical distribution of the species, and then an account of the anatomy and reproduction of lichens. Stein, as might be expected, is an opponent of Schwendener's lichen theory, and bases his objection on the ground that many observations have shown that the first gonidia of the lichen are developed by division or budding from certain side branches of the lichen hyphæ, in a manner probably somewhat similar to the formation of the new cells of Saccharomyces. This alleged fact, which he does not support by any reference to his own observations or to those of other botanists, he considers of itself renders the whole of the Schwendener-Bornet theory untenable.

The Silesian lichens include 705 species belonging to 158 genera. The main feature in regard to the genera being the reduction of Lecidea and Lecanora, to comparatively limited dimensions by the adoption of many new genera. The distribution of the Silesian lichens, according to Stein, confirms the statement that lichens are the "Children of the Air and of the Light," most of them inhabiting the higher parts of Silesia in regions three and four. Common to all the four regions are 76 species, or 11 per cent. of the total given by Stein of 678 species in the introduction, although the description gives 705 consecutive numbers. The first region contains 84 species, of which only 8 are peculiar to it. The second region contains 281 species, or about 41 per cent. of the whole, 115, or 17 per cent. being limited to it. The third